

State of California
AIR RESOURCES BOARD

EXECUTIVE ORDER D-11-3
Relating to Exemptions under Section 27156
of the Vehicle Code

WESTERN CONTROLS, INC.
BREAKERLESS CAPACITIVE DISCHARGE IGNITION SYSTEM

Pursuant to the authority vested in the Air Resources Board by Section 27156 of the Vehicle Code; and

Pursuant to the authority vested in the undersigned by Section 39515 of the Health and Safety Code;

IT IS ORDERED AND RESOLVED: That the installation of the breakerless capacitive discharge ignition systems manufactured by Western Controls Inc., 805 W. Madison, Phoenix, Arizona, 85507, and marketed as indicated below has been found to not reduce the effectiveness of required motor vehicle pollution control devices and, therefore, are exempt from the prohibitions of Section 27156 of the Vehicle Code for 1974 and older model-year vehicles except the following:

1. Vehicles originally equipped with an electronic ignition system whether it is a breakerless, capacitive discharge, or transistorized type.
2. All 1966-70 model-year vehicles equipped with a Dana or Carter NOx retrofit device using an electronic speed sensor.

The following is a list of each device manufactured by Western Controls Inc. and marketed by another company; each device consists of a sensor, d-c converter, storage capacitor and an electronic switch.

<u>Brand Name and Marketing Company</u>	<u>Models</u>
Western Controls, Inc. 805 W. Madison St. Phx. Ariz. 85007	B12S, 1051 CD System B12P, 1052 HP CD System
"Max" Western Controls Inc. 805 W. Madison St. Phx. Ariz. 85007	1001 CD System 1002 HP CD System
Filkotronic Ignition Filko Div. of F & B Mfg. 5480 N. Northwest Highway Chicago, Ill. 60630	FL-100, FI-125 CD System FI-101, FI-126 HP CD System

Brand Name and
Marketing CompanyModels

Hays
Hays Sales
15116 Adams Street
Midway City, CA 92655

CD-2041 CD System
HP-CD2042 HP CD System

Thermo King
Thermotronic Ignition
314 W. 90th St.
Minneapolis, Minn. 55420

80-4001, 80-5001 CD System
80-4002, 80-5002 HP CD System

This Executive Order is valid provided that installation instructions for this device will not recommend tuning the vehicle to specifications different than those listed by the vehicle manufacturer.

Changes made to the design or operating conditions of the device, as exempted by the Air Resources Board, that adversely affect the performance of the vehicle's pollution control system shall invalidate this Executive Order.

Marketing of this device using an identification other than that shown in this Executive Order or marketing of this device for an application other than those listed in this Executive Order shall be prohibited unless prior approval is obtained from the Air Resources Board.

This Executive Order does not constitute any opinion as to the effect that the use of this device may have on any warranty either expressed or implied by the vehicle manufacturer.

THIS EXECUTIVE ORDER DOES NOT CONSTITUTE A CERTIFICATION, ACCREDITATION, APPROVAL, OR ANY OTHER TYPE OF ENDORSEMENT BY THE AIR RESOURCES BOARD OF ANY CLAIMS OF THE APPLICANT CONCERNING ANTI-POLLUTION BENEFITS OR ANY ALLEGED BENEFITS OF THE "WESTERN CONTROLS BREAKERLESS CAPACITIVE DISCHARGE IGNITION SYSTEM."

No claim of any kind, such as "Approved by Air Resources Board" may be made with respect to the action taken herein in any advertising or other oral or written communication.

Section 17500 of the Business and Professions Code makes untrue or misleading advertising unlawful, and Section 17534 makes violation punishable as a misdemeanor.

Section 43644 of the Health and Safety Code provide as follows:

"43644. (a) No person shall install, sell, offer for sale, or advertise, or, except in an application to the board for accreditation of a device, represent any device as a motor vehicle pollution control device for use on any used motor vehicle unless that device has been accredited by the board. No person shall sell, offer for sale, advertise, or represent any motor vehicle pollution control device as an accredited device which, in fact, is not an accredited device. Any violation of this subdivision is a misdemeanor."

Any apparent violation of the conditions of this Executive Order will be submitted to the Attorney General of California for such action as he deems advisable.

Executive Order D-11-2, dated November 27, 1974 is superseded and of no further force and effect.

Executed at Sacramento, California, this 30 day of April, 1976.

original signed by
Thomas C. Austin
Deputy Executive Officer-Technical

State of California

AIR RESOURCES BOARD

STAFF REPORT

March 10, 1976

Evaluation of Western Controls, Inc.'s.
"Breakerless Capacitive Discharge Ignition System"
for exemption from the prohibitions of Motor Vehicle Code Section 27156

I. Introduction

Western Controls, Inc., 805 West Madison, Phoenix, Arizona, 85007 was issued an Executive Order number D-11-2 dated November 27, 1974 which grants an exemption from the prohibitions of Motor Vehicle Code Section 27156 for their "Breakerless Capacitive Discharge Ignition System" which is also known by other brand names described in Executive Order D-11-2. The exemption was for 1974 and older model year vehicles except the following:

1. Vehicles originally equipped with an electronic ignition system whether it is a breakerless, capacitive discharge, or transistorized type.
2. All 1966-70 model-year vehicles equipped with a Dana or Carter NOx retrofit device using an electronic speed sensor.

Western Controls has now applied (Exhibit A) for a change of part numbers and the addition of another trade name "Hays". The "Hays" unit would be marketed by Hays Sales, 15116 Adams Street, Midway City, California, 92655. The units would be the same as previously exempted except for part numbers and trade name. In addition, Western Controls has applied for the use of their device with 1966-70 model year vehicles equipped with NOx retrofit devices using electronic speed sensors (i.e.

March 10, 1976

Carter, Dana or AQP - Electro-NOx). They propose to supply a tachometer adapter model 4001 for electrical compatability between their breakerless capacitive discharge (C-D) ignition system and the NOx retrofit device speed sensors.

II. System Description

The Western Controls, Inc's. breakerless C-D ignition system consists of a magnetic sensor, d-c converter, storage capacitor and an electronic switch. The sensor is a magnetic pickup unit mounted within the distributor to sense the high points of the cam lobe. The signal pulse triggers the C-D unit and discharges the energy in the storage capacitor through the primary coil of the ignition system.

III. System Evaluation

The device had been evaluated for previous exemptions (Executive Orders D11, D-11-1, and D-11-2) by comparison of emission tests and ignition advance characteristics on a vehicle. Since a bench test had not been performed previously, the unit was bench tested at the ARB laboratory for correlation purposes and to determine the compatibility of the unit with the tachometer adapter and the NOx retrofit device speed sensors.

The bench tests were conducted by the Air Resources Board Laboratory on an ignition systems simulator which consists of a Sun distributor tester, Techtronix Oscilloscope, Sun Ignition analyzer and associated accessories in accordance with SAE-J973a instructions. A summary of the electrical tests performed on a Chrysler and Ford 8 cylinder distributor are shown in Table I.

A review of the centrifugal and vacuum advance data shows spark retardation at cruise as follows:

	<u>Centrifugal Retard</u>	<u>Vacuum Retard</u>	<u>Combined Retard</u>
Chrysler	3° @ 3200 RPM	6.5° @ 20" Hg.	9.5°
Ford	4° @ 3200 RPM	3.5° @ 15" Hg.	7.5°

This degree of retardation is expected to have adverse effect on the valve life of an engine. The deterioration of exhaust valve sealing leads to higher hydrocarbon emissions.

The various other electrical characteristics compared are typical of C-D systems. The device data shows spark energy degradation from O.E.M. as follows:

<u>Engine RPM</u>	<u>% Energy Reduction (Chrysler)</u>	<u>% Energy Reduction (Ford)</u>
600	-52.2	-27.4
3000	-45.3	-17.9

This amount of spark energy loss is expected to have adverse effects on hydrocarbon emissions particularly on marginal vehicles or under cold ambient temperature conditions.

A laboratory test indicated that the C-D unit with the tachometer adapter was compatible with the Carter-CER Speed Sensing Unit.

March 10, 1976

IV. Conclusions and Recommendations

Based on an evaluation of the application and all available data the following conclusion and recommendations are made:

- 1) Permit revision of Executive Order D-11-2 to show new part numbers and the additional brand name "Hays" for the already exempt device.
- 2) Deny the new application usage of the device on 1966-70 model year vehicles equipped with a Dana or Carter NOx retrofit device using an electronic speed sensor since the "Breakerless Capacitive Discharge Ignition System" does not meet the current Air Resources Boards criteria.

Table I - ARB Data Summary of Western Controls'
Breakerless C-D Ignition System

A. Centrifugal Spark Advance in Crankshaft Degrees

1972 Chrysler - 8 cylinder

1967 Ford - 8 cylinder

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	0	0	0	0
1400	18.5	16.0	10.5	10.0
2000	20.5	18.5	16.0	13.5
2600	22.5	20.5	19.0	15.0
3200	24.5	21.5	20.5	16.5

B. Vacuum Spark Advance in Crankshaft Degrees

<u>Vacuum in. Hg.</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
3	0	0	0	0
9	1.0	0	11.0	9.0
12	10.0	6.0	16.5	14.0
15	21.0	15.0	21.5	18.0
20	21.5	15.0	24.0	22.5

C. Spark Duration in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	1800	420	1450	400
3000	1300	400	1000	400

D. Secondary Voltage Rise Time in Microseconds

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	40	28	40	30
3000	40	28	40	30

E. Spark Energy in Millijoules

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	27.2	13.0	19.0	13.8
3000	25.6	14.0	16.8	13.8

F. Available Voltage in Kilovolts (with load)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	25.0	23.5	23.5	22.5
3000	19.0	22.0	21.0	21.5

G. Available Voltage in Kilovolts (simulating fouled spark plug)

<u>Engine RPM</u>	<u>Baseline</u>	<u>Device</u>	<u>Baseline</u>	<u>Device</u>
600	20.0	19.0	18.5	18.0
3000	13.0	18.5	16.0	17.0



December 15, 1975

Mr. K. D. Drachand, Chief
State of Calif. Resources Agency
Air Resources Board Laboratory
9528 Telstar Avenue
El Monte, Calif. 91731

RE: Your letter of Nov. 17, 1975

Dear Mr. Drachand:

Part 1 of your letter, CD Ignition Systems.

1. Please find enclosed packet #1 of schematic diagrams showing BE-12 circuits and new 1001 circuit. BE-12 circuit consisted of PC-12 converter unit and ET-12 trigger unit. Both units contained electronic components. PC-12HP components are circled and are added to make PC12HP from PC-12S. New converter models 1001 and 1002 contain virtually the same circuitry.

System 1051 consists of converter model 1001 and trigger module 2001. All electronics are contained in 1001 module. This system is for engines up to 5000 RPM (8 cyl.).

System 1052 consists of trigger module 2001 and converter model 1002. This system is for engines up to 10,000 RPM (8cyl.)

2. Mfg. Label	Model Nos.
Western Controls Inc.	1051 CD System
805 W. Madison St.	1052 HP CD System
Phx. Ariz. 85007	1058 TR System
"MAX" Label	1001 CD System
Western Controls Inc.	1002 HP CD System
805 W. Madison St.	1008 TR System
Phx. Ariz. 85007	
Filkotronic Ignition Label	F1-125 CD System
Filko Div. of F & B Mfg.	F1-126 HP CD System
5480 N. Northwest Highway	F1-150 TR System
Chicago, Ill. 60630	
Hays Label	CD-2041 CD System
Hays Sales	HP-CD2042 HP CD System
15116 Adams Street	TR-2048 TR System
Midway City, Calif. 92655	

Western Controls, Inc. 805 WEST MADISON, PHOENIX, ARIZONA 85007 (602) 258-2821



Page 2

Mr. Drachand

Thermo King Label	80-5001 CD System
Thermotronic Ignition	80-5002 HP CD System
314 W. 90th St.	
Minneapolis, Minn. 55420	

3. The Tachometer Adapter Model 4001

The Tachometer Adapter will not be supplied with the ignition kits. It will be sold separately by the dealers. Packet #2 enclosed contains the schematic diagram and the installation instructions. An additional note will be included with the ignition kit to advise the customer of need for the adapter on 1966 through 1970 vehicles using NO_x devices. Its use is required only on the capacitor discharge system. A sample unit is also enclosed.

Part 2 of your letter. Western Controls Models 1058, "MAX" 1008, Filkotronic FI-150 and Hays Model TR2048.

1. Model 1058 is the same product as MAX 1008. Filkotronic FI-150 and Hays 2048. Packet #3 contains an ignition system specification form for this device and the schematic diagram.

2. Purpose of the device is to retrofit breakerpoint ignition systems in all engines for which adapter kits are available.

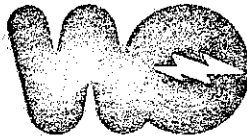
3. Detailed instruction sheet are included in the sample systems supplied.

4. 1200 RPM 10.5° 1300 RPM 10.5°

5. Spark gap was set for 12KV. (Per SAE J973a)

6. Test data on 1969 4 cylinder Volkswagen distributor was run to show the effect on the distributor timing when the trigger module is installed in place of the breakerpoints and operated with either the CD Model 1051 or the TR Model 1058. The engine timing is the same for both systems types. Requested test data is enclosed with packet #3.

7 Packet #3 contains an adapter kit guide for vehicles which can be fitted with the CD or TR Ignition Systems. We request exemption for all vehicles listed in the guide. The ignition systems are sold separately from the adapter kits to minimize dealer inventory.



Page 3

Mr. Drachand

8. Two model 1058 systems are enclosed as are 1 each adapter kit for 8 cylinder Chrysler and 8 cylinder Ford.

It will not be necessary to return the parts.

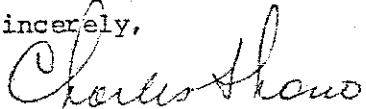
9. The TR ignition is compatible with 1966 through 1970 vehicles equipped with NO_x devises employing speed sensors.

Part 3 of your letter. Models 1061, 1062, 1063 and 1064.

We would like to submit this information at a later date since the test information you require is not yet available.

If you require further information, please advise me.

Sincerely,



Charles L. Shano

CLS/tm

cc: Tom Stafford- Hays Corp.
Jerry Adreon- Filko Mfg.
Al Angelini- Filko Mfg.
Eric P Grant



October 9, 1975

Mr. G.C. Hass
Chief
Division of Vehicle Emissions Control
Air Resources Board
9528 Telstar Avenue
El Monte, Calif. 91713

Dear Mr. Hass:

Please note that some part number changes have taken place for 1975/76 Western Controls Inc. products. The part number changes were made due to different packaging in order to:

- (1) Make Western Controls products more attractive
- (2) Make Thermo King products more attractive
- (3) Make Filko products outwardly appear to be distinctively different from (1) and (2) above.

The new packaging in no way changes or alters electronic circuitry or characteristics.

The following chart relates the number changes:

Western Controls Model No. BE12S	changed to	Western Controls Model No. 1051
Western Controls Model No. BE12HP	changed to	Western Controls Model No. 1052
Thermo King Corp. "Thermotronic Model 80-4001"	Changed to	Thermo King Corp. "Thermotronic Model 80-5001"
Thermo King Corp. "Thermotronic Model 80-4002"	changed to	Thermo King Corp. "Thermotronic Model 80-5002"
Filko Ignition Div. F & B Mfg. Inc. "Filkotronic Model F-100"	changed to	Filko Ignition Div. F & B Mfg. Inc. "Filkotronic Model F-125"
Filko Ignition Div. F & B Mfg. Inc. "Filkotronic Model F-101"	changed to	Filko Ignition Div. F & B Mfg. Inc. "Filkotronic Model F-126"

The above models are exempted under State of California Air Resources Board Executive Order D-11-2 dated 11-27-74.

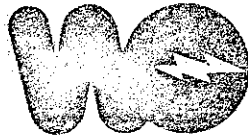
Also, please note that Western Controls Models 1051 and 1052 will soon be marketed under "MAX-CD" and "MAX-H.P. CD" labels by several national chains.

Very truly yours,

Fred Schneider
Fred Schneider

FS/ts

Western Controls, Inc. 805 WEST MADISON, PHOENIX, ARIZONA 85007 (602) 258-2821



October 24, 1975

Mr. G. C. Hass
Division of Vehicle Emissions Control
Air Resources Board
9528 Telstar Avenue
El Monte, Calif. 91713

Dear Mr. Hass:

Pursuant to our Mr. Fred Schneider's letter of October 9, 1975, requesting revision of executive order D-11-2. This letter will advise you of further additions and requested revisions.

- Please add:
- (1) Hays Ignition Series 2000. Breakerless CD Ignition which will include repackaged models 1051 and 1052. These will be marketed under Hays Sales Co. 15116 Adams Street, Midway City, Calif. 92655.
 - (2) MAX CD Model 500 same as 1051
Model 1000 same as 1052
These will be marketed by Western Controls
 - (3) We respectfully request revision of executive order D-11-2 dated 11-27-74 to remove restriction of items.
 - (1) Our system types 1061, 1062 for Chrysler engines and 1063, 1064 for Ford Engines will replace the OEM Transistor units with Western Controls CD converter. The system uses the original equipment distributor breakerless system to drive the CD converter. Installation of the CD unit always is equal to, or improves the OEM ignition.
 - (2) Western Controls Tachometer adapter available for operation of tachometer circuits will drive the NO_x retrofit devices in question. The tachometer adapter is model 4001. Its use can be required on 1966 through 1970 vehicle using NO_x devices requiring an electronic speed sensor.

Sincerely,

Charles L. Shano

Charles L. Shano

LS/tm